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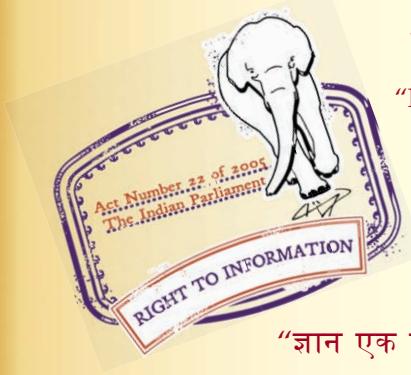
“Step Out From the Old to the New”

IS 5153 (1969): Proportional Compasses - 150, 200 AND 300 mm [PGD 22: Educational Instruments and Equipment]

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“Knowledge is such a treasure which cannot be stolen”





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*Indian Standard*

SPECIFICATION FOR  
PROPORTIONAL COMPASSES—150,  
200 AND 300 mm

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**BUREAU OF INDIAN STANDARDS**  
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG  
NEW DELHI 110002

# Indian Standard

## SPECIFICATION FOR PROPORTIONAL COMPASSES—150, 200 AND 300 mm

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# Indian Standard

## SPECIFICATION FOR PROPORTIONAL COMPASSES—150, 200 AND 300 mm

### 0. FOREWORD

**0.1** This Indian Standard was adopted by the Indian Standards Institution on 30 May 1969, after the draft finalized by the Optical and Mathematical Instruments Sectional Committee had been approved by the Mechanical Engineering Division Council.

**0.2** Proportional compasses are used for transferring the distances from one drawing to another at a different scale. Normally such an instrument is provided with four different scales for various applications.

**0.3** For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test, shall be rounded off in accordance with IS : 2-1960\*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

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### 1. SCOPE

**1.1** This standard covers the requirements of proportional compasses having nominal sizes 150, 200 and 300 mm for use in drawing offices.

### 2. NOMENCLATURE

**2.1** The nomenclature of different parts of the proportional compasses is shown in Fig. 1.

### 3. MATERIAL

**3.1** The arms, indicators, holding plates for indicators and clamping nut shall be manufactured from electrum or hard rolled brass conforming to alloy designation Cu Zn 30 of IS : 410-1967†.

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\*Rules for rounding off numerical values (revised).

†Specification for rolled brass plate, sheet, strip and foil (second revision).

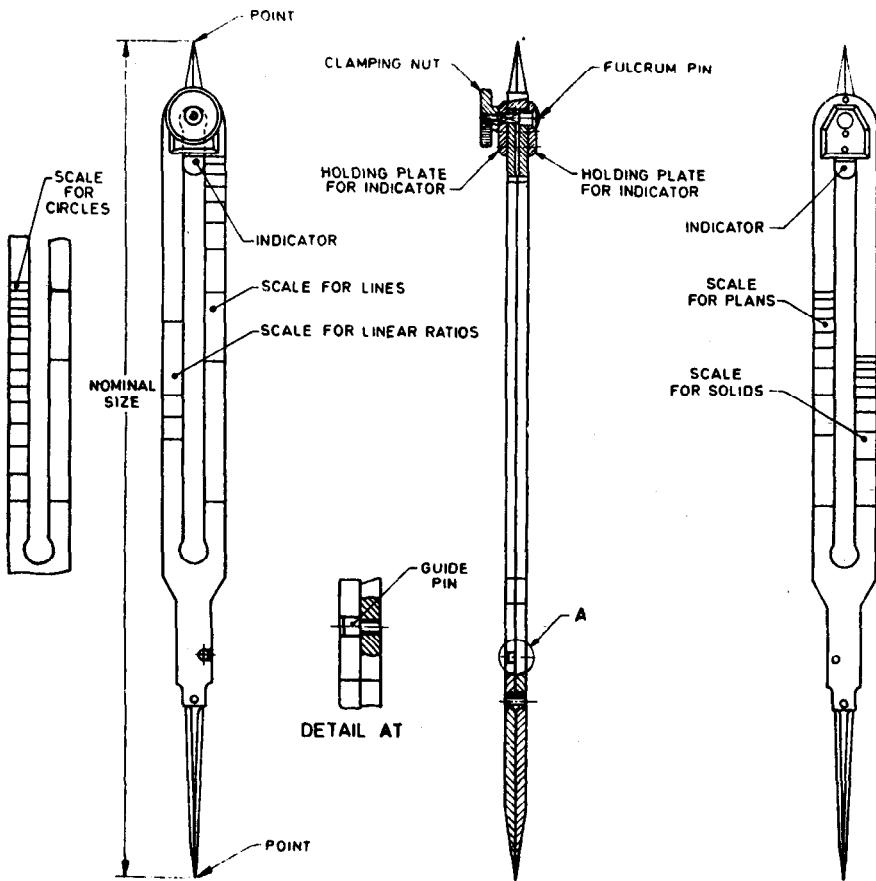


FIG. 1 NOMENCLATURE FOR PROPORTIONAL COMPASSES

3.2 The points shall be of cast steel and shall be hardened and ground.

3.3 Fulcrum pin shall be manufactured from steel and shall be hardened to about 450 HV.

3.4 Guide pin and screws for fixing indicators shall be manufactured from mild steel.

#### 4. DIMENSIONS, ACCURACY AND GRADUATIONS

4.1 **Dimensions** — The proportional compasses shall be of three nominal sizes, that is, 150, 200 and 300 mm. The design details shall be at the

discretion of the manufacturer as long as the requirements stipulated in this standard are complied with.

**4.2 Accuracy** — The accuracy of transferring a distance shall be within one percent of the nominal value of distance. The nominal value shall be the value calculated by multiplying the distance transferred by the linear ratio.

**4.3 Scales and Ratios** — The scale graduations and figuring shall be fine and deep enough for ink filling. The instrument shall preferably have the following scales and ratios.

**4.3.1 Scales for Lines** — The scale is used for reducing or enlarging the length of lines in a given proportion and shall be marked 2, 3, 4, 5, 6, 7, 8, 9, and 10.

**4.3.2 Scales for Linear Ratio** — The divisions shall be marked  $\frac{3}{4}$ ,  $\frac{2}{3}$ ,  $\frac{3}{5}$  and  $\frac{2}{5}$ .

**4.3.3 Scale for Plans** — The scale is used for reducing or enlarging the area of a plan in a given proportion and shall be marked 2, 3, 4, 5, 6, 7, 8, 9 and 10.

**4.3.4 Scale for Solids** — The scale is used for reducing or enlarging the contents of a solid in a given proportion and shall be marked 2, 3, 4, 5, 6, 7, 8, 9 and 10.

**4.3.5 Scales of Circles** — In some compasses, instead of a scale for linear ratio, a scale of circles may be marked. This scale is used to divide the circumference of a circle into a number of equal parts up to 20. The slide being set to the number of divisions required and longer points opened to radius of the circle. The shorter points will divide the circumference of the circle into a number of equal parts according to setting. The scale for circles shall be marked 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19 and 20.

## 5. GENERAL REQUIREMENTS

**5.1 Arms** — The design and construction of the arms shall be of robust cross-section to avoid bending or distortion. Faces shall be flat, parallel and polished. The arms shall be fabricated in three pieces, that is, scale body and two points. There shall be a notch provided on one arm to accommodate the corresponding guide pin fitted on the other. The points shall be ground sharp and shall lie over one another when the instrument is closed.

**5.2 Indicators** — Indicators shall be good sliding fit in the slot of arm, shall be flat and properly levelled with the upper face of the arm. There shall be a clearance between two indicators while assembled. The ends shall be rounded off to prevent scraping of the groove in the arms.

**5.3 Holding Plate for Indicator** — Holding plate for indicator shall have flat and polished faces to ensure proper overlapping, sliding and clamping.

**5.4 Fulcrum Pin** — Fulcrum pin shall have good sliding fit in the holes of indicators and holding plates for indicators. The design of the pin shall be such as to avoid free rotation of the arms.

**5.5 Clamping Nut** — The nut shall be so designed as to ensure proper clamping of arms in any position. The periphery of the nut shall be knurled for gripping.

## 6. WORKMANSHIP AND FINISH

**6.1** The compasses shall be manufactured and assembled with good quality workmanship and shall operate smoothly without stiffness or undue play throughout the range.

**6.2** Compasses made from electrum shall be polished and when made from brass, they shall be nickel plated.

## 7. MARKING

**7.1** Each scale shall be identified by suitable engraving of words PLANS, SOLIDS, LINES, LINEAR RATIOS or CIRCLES, as the case may be.

**7.2** Each pair of compasses shall be legibly and indelibly marked with the name, initials or trade-mark of the manufacturer at a suitable place.

**7.2.1** Compasses may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution ( Certification Marks ) Act, and the Rules and Regulations made thereunder. Presence of this mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard, under a well-defined system of inspection, testing and quality control during production. This system, which is devised and supervised by ISI and operated by the producer, has the further safeguard that the products as actually marketed are continuously checked by ISI for conformity to the standard. Details of conditions, under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

## 8. PACKING

**8.1** The instrument shall be packed in a suitable case.

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**AMENDMENT NO. 1      OCTOBER 1980**

**TO**

**IS : 5153-1969 SPECIFICATION FOR PROPORTIONAL  
COMPASSES — 150, 200 AND 300 mm**

**Alteration**

*( Page 5, clause 4.3.5, last sentence )* — Substitute the following for the existing sentence:

‘The scale for circles shall be marked 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19 and 20.’

( EDC 36 )